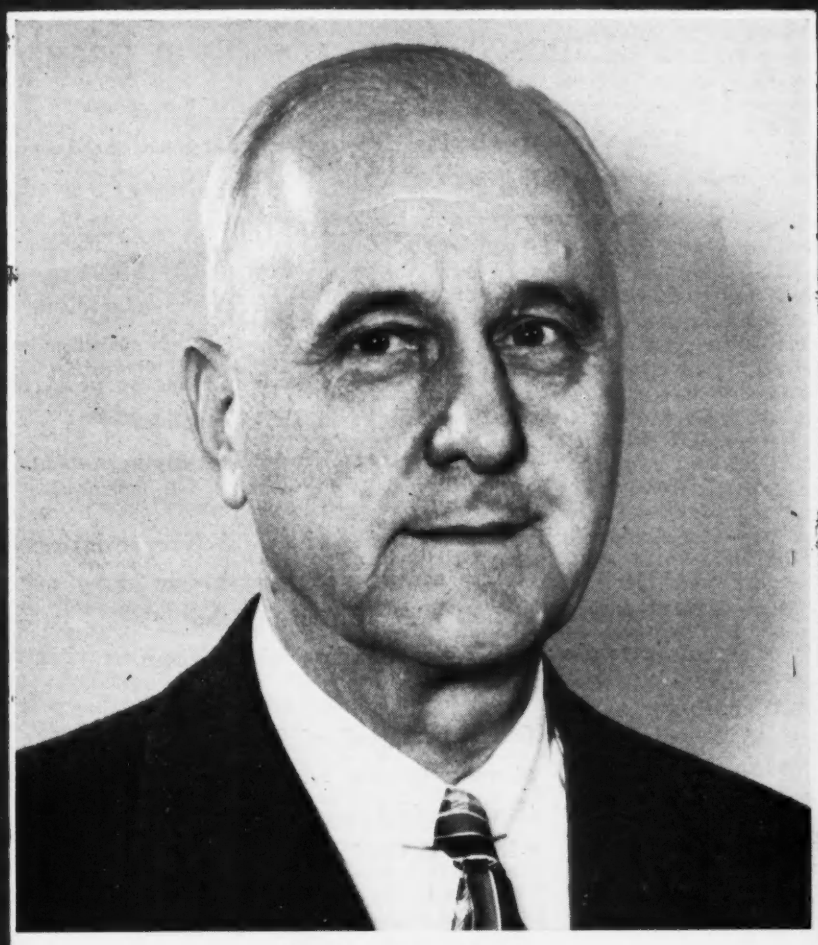
The Citrus Industry



MERTON L. COREY
Who Conducted the Membership Drive for Florida Citrus Mutual

Vol. 30, No. 9 September, 1940

NOW--MORE THAN EVER IT IS VITALLY IMPORTANT

That Your Trees and that portion of Your Crop which escaped damage from the recent storm be kept in the most perfect condition possible.

The shock which citrus trees have undergone must be counteracted by the application of health-giving fertilizers designed to provide your groves wth new life and strength.

Fruit losses which were suffered as a result of the recent blow make that fruit which remains even more valuable for potential market purposes than it was before the storm, so the application of proper feeding to your trees is indeed vitally important.

And, whether it be following a harmful storm or during any normal season you'll find many, many growers in every section of the Florida citrus belt who will tell you that Florida Favorite Fertilizers always do an outstanding job for them.

Our expert staff of field service men are at your service . . . . and our fleet of trucks deliver your fertilizer to your groves when you need it.

Florida Favorite
FERTILIZER, INC.

Old Tampa Road **Lakeland, Fla.**

Alexander Reports Status of California and Texas Citrus...

"Florida citrus growers have the greatest opportunity for the development of their industry that they have had since the first citrus grove was planted in this state," said J. Frank Alexander after returning from an extensive survey of the citrus situation in Texas and California.

Alexander is vice president of the Lake Garfield Nurseries Co., at Bartow, and is throughly familiar with all phases of citrus as the result of many years in which he has devoted his energies to that industry.

Together with Hal Ellis, of Bartow, Alexander made a trip recently with Bartow and San Francisco as its terminal points. The trip was made by air with stops on the way to enable the Bartow men to survey the situation in both Texas and California.

During the trip Alexander talked not only to growers, packing house managers, nurserymen and experimental station personnel, but made numerous trips through a great many groves. In a large number of instances he stated his itinerary was arranged by a representative of Swift & Co., who carried him over wide areas of the citrus belt in the Rio Grande Valley and again in the citrus belt of California.

Referring to Texas, Alexander stated that growers there told him that two million out of the fourteen million trees which were planted in Texas prior to the freeze last winter had been pushed out by bulldozers and it was expected another half to three-quarters of a million trees would have to be taken up.

The frozen trees were from one to eight years of age and included most of Texas' red grapefruit according to Alexander's informants, leaving only Marsh Seedless and Duncans which might again be ready for market during the 1951 season.

Texas growers estimated that their total crop for the coming season would amount to only 15 to 35 per cent of their normal crop, Alexander stated. He added further that several packing house managers told him that only a small per cent of the fruit would be suitable for shipping to the fresh fruit market.

Alexander's contacts indicated that a large number of the growers whose groves had been destroyed by the freeze were not planning to replant and that further there were practically no trees available for such purposes in Texas nurseries.

In addition to the freeze Texas growers are plagued with the rising salt water table and heavy alkalinity of the soil in certain sections of the Rio Grande Valley.

J. Frank Alexander

Alexander said that north of Weslaco he saw a small acreage of groves which appeared to be in good condition, but that in the Harlingen, Mission and McAllen sections groves were not in good condition.

In certain areas where trees had been removed the owners had planted cotton and were making a fine crop. Official estimates were that the Rio Grande Valley would produce 500,000 bales of cotton this season.

In California, Alexander stated, lack of adequate water, the quick decline and the small fruit sizes were providing more than one state's share of trouble. His survey covered something more than a 100 mile area with Los Angeles as the center.

A large crop of navels and valencias is in prospect, stated Alexander, but the bloom was from 30 to 45 days late which might delay their marketing schedule although some authorities felt that the shipping schedule would not be delayed to the extent of the delayed bloom.

California growers were apprehensive over the continued small size and thought that the severe cold last year might tend to intensify this condition. In Covina the heart of the quick decline area many growers are taking up their citrus trees and either planting their land in vegetable crops or dividing it into subdivisions, which were reported to be bringing their owners about $8400 per acre. Farm and grove land, said Alexander, was still selling at $1200 to $2500 per acre.

In the Santa Paulo area Alexander reported seeing some of the finest groves he saw on the entire trip.

He also told of an interesting visit with Dr. Hass, who has for years been a recognized citrus authority. Alexander reported that not only technicians, but many well informed growers had told him that Florida's program of cutural pratices was the finest in the United States.

Alexander was emphatic in his assertion that Florida citrus growers were faced with the greatest opportunity in their history if they would work together and cooperate in their marketing arrangements.

Ellis returned home after the survey was completed and Alexander went on to San Francisco to attend the American Association of Nuserymen before flying home. He commented most favorably upon the invariable courtesy shown air travellers by everyone connected with the airlines upon which he travelled.

HEGARI FROM CERTIFIED SEED PRODUCES HIGHER YIELDS, AGENT REPORTS

The difference in crop results from certified and uncertified seed is well demonstrated in hegari growing on William Masters' farm in the Elkton section according to County Agent P. R. Mullen.

Unable to obtain enough certified seed for his planting, Mr. Masters planted uncertified seed on about 25 percent of his hegari acreage. The acreage planted to certified seed is producing a good, uniform crop while that planted to uncertified seed is making satisfactory growth but is uneven in maturing and will not produce as high yields as the certified acreage.

Citrus Insect Outlook For September, 1949

J. T. GRIFFITHS, JR., AND W. L. THOMPSON, FLORIDA CITRUS EXPERIMENT STATION, LAKE ALFRED

August and September are the months that we usually begin to get calls from growers who tried to get by on early oranges and did not use a summer oil spray for scale control. The first such call came on August 18. At this same season, it may become obvious that the first oil spray was not sufficient and that a second spray will be necessary. Some of the factors to be considered in planning scale control measures for September and October are outlined below.

Oil sprays in September cause a delay in the degreening of fruit and also prevent the formation of soluble soilds. Although this is particularly important on early oranges, the solids of Valencias are equally affected. These effects will be markedly exaggerated if a summer oil spray has preceded the September one. Color break is especially important for fruit to be shipped prior to November 15. Thus the closer that oil is applied to the date of picking, the more difficult it will be to break color in coloring rooms. September and October oil sprays are undesirable, but failure to control scale insects may result in leaf and fruit drop as well as dead wood.

If sprays are to be applied for scale control in September, the best results on purple scales will be obtained during the first part of the month. More young scales will be present at that time. Best results on Florida red scale will be obtained during the first week and during the last week of the month. Sprays for red scale should not be applied between September 10 and September 20 as they will be laying eggs during that time

For more specific recommendations for scale control during the late summer and fall, consult the University of Florida, Citrus Exueriment Station at Lake Alfred.

Pumpkin Bugs

In Florida the common name, pumpkin bug, is used to apply to any of several species of stink bugs. Two species come under the classification of leaf-footed plant bug. These are rather elongated bugs, brown in color with some white markings across the front part of the top side of the insect. Their legs are expanded to look like leaves. A green stink bug also comes under the pumpkin bug classification. Adults of these insects have been noted during the past week or so in old fields of watermelons, and these insects also tend to build up on leguminous cover crops. Where watermelon fields are adjacent to citrus or where leguminous cover crops are being used, checks should be made for these insects. If any are found they should be watched carefully since it is often possible that during the last part of September and in October, they may migrate from cover crop to oranges or tangerines. This is particularly apt to happen, if cover crops are disced down. Early oranges and tangerines are most susceptible, and it is possible that this type of insect will drop an entire crop within a week or so. Control measures for these bugs involve the use of either toxaphene or chlordane. Chlordane should be used at between 30 and 40 pounds of the 5 percent dust per acre and toxaphene at around 40 pounds of a 10 percent dust per acre. Where sprays are to be used, attempt to get at least 2 pounds of actual chlordane per acre and 4 pounds of actual toxaphene per acre

Grasshoppers

Checks have been made in the Lakeland section of Polk County for hatch of the bird grasshoppers. So far no hatching has been noted, but some young hoppers of other species of grasshoppers are present in the field. In general, adult populations of the bird grasshopper are reduced as compared with preceding years, and it is not to be expected that they will be present in serious numbers in very many places. However, reports have come in of heavy concentrations of adult bird grasshoppers in a few groves

A review of the cultural practices to be followed at this time of the year for grasshopper control are probably in order. Those growers who may anticipate that they will have grasshopper trouble should be prepared to clean cultivate their groves very shortly. It is to be expected that eggs will begin to hatch sometime during September. As the little hoppers grow and reach a size of about one inch in length, they may move from cover crop to trees and can do considerable damage. In order to prevent this, a thorough discing should take place prior to the time that the hoppers reach three-quarters of an inch in size. This will not only kill many of the small hoppers, but will make it impossible for those which hatch subsequently to find food, and they will die as a result. Clean cultivation at this time of the year can render a grove virtually immune to grasshopper attacks unless the grasshoppers actually fly or walk in from adjacent fields or groves. In general, control measures for adults in September need not be taken. Most of these adults are dying, and except in rare instances, they will do very little damage. If insecticides are necessary, use dosages outlined above for pumpkin bug control

Rust Mites

Rust mite infestations have been relatively heavy during August and it is quite possoble that the situation will continue into September. Certainly careful checks on threatening rust mite infestations should be made. Remember that the more thorough the job is at this time of the year, the longer the control. In the long run a good job is the cheapest one.

BLALOCK RETIRING AS STATE LEADER OF BOYS' 4-H PROGRAMS

Raymond W. Blalock, boys' club agent, is retiring August 31 after 33 years with the University of Florida Agricultural Extension Service.

He left a New York farm to settle on a fertile farm in the Chattahoochee valley of Florida in 1911 and in 1916 affiliated with the Extension Service as county agent in Marion County, with headquarters in Ocala. In October 1918 he became assistant boys' club agent and on February 1, 1920, was promoted to the position from which he is now retiring.

Extension Director H. G. Clayton, in announcing Blalock's retirement, says the club leader has had a hand in training nearly 100,000 Florida rural boys in 4-H club work, which is conducted by county agents.

The Citrus Industry
EXCLUSIVE SPECIALIZED CITRUS PUBLICATION
Issued Monthly
Representative of every interest
Representing no special interest

Publication office at Bartow, Florida. Entered as second class matter February 16, 1920, at the post office at Tampa, Florida, under the act of March 3, 1879. Entered as second class matter June 19, 1933, at the post office at Bartow, Florida, under act of March 3, 1879.

Chairman Explains Plans Of Florida Citrus Commission

DODGE TAYLOR
AT FLORIDA CITRUS INSTITUTE
CAMP McQUARRIE

I am asked to talk to you briefly tonight on the plans of the Florida Citrus Commission for the 1949-50 season.

The Florida Citrus Commission is the legal governing body of the citrus industry. As such it is charged with responsibility for the following functions:

1. The administration of the citrus advertising funds and the handling of the promotional activities in connection therewith.

2. The conduct of research and transportation problems of the industry, and

3. The regulatory authority of the citrus industry, which, since the enactment of the 1949 Citrus Code, includes the canning and concentrating fields.

Probably in the public mind the primary function of the Citrus Commission is the administration of the citrus advertising fund. All of the money which comes into the hands of the Commission is primarily for the purpose of advertising Florida citrus products. During the 1948-49 season this totaled approximately $2,150,000.00, but from this first is deducted 3% for the state general revenue fund and then the necessary operating expenses of the Commission, limited by law to $100,000. Furthermore, expenditures for research and transportation problems, limited to 5% and 3%, respectively, of total collections, are then set aside. For the 1948-49 season approximately $1,640,000.00 was left for publicity, sales promotion and advertising, of which $390,000.00 was spent for publicity and sales promotion and $1,250,000.00 for advertising. The amount available for advertising during the 1949-50 season will probably run approximately the same or a trifle larger.

The advertising program as tentatively approved by the Commission for the coming season uses the same general theme as that of last season—that is, tying in with general Florida backgrounds to convey to the consuming public that Florida sunshine and Florida health can be obtained thru the use of Florida citrus products. In my own opinion at least, the campaign last season was subject to criticism in that beach scenes or similar background took such a large portion of the ad that it was difficult to tell whether we were advertising Florida hotels and resorts or Florida citrus fruit. From that standpoint the advertising has been immeasurably improved for the coming season in that the article which we are selling—that is, citrus fruit or citrus juices—is the dominant factor in the ad. There was likewise legitimate criticism last season of some of the color work. In many ads the color of the orange juice closely resembled that of grapefruit juice and the effectiveness of the advertising was correspondingly decreased. That situation is being corrected for this coming season's ads. The Commission has selected standard colors for oranges, grapefruit and tangerines, as well as for the prices which will be used throughout the season. Admittedly, the color of our product is not standard throughout the season. We all know that Valencia juice is much darker than Hamlin juice and that there are other varietal differences. We are, however, traditionally expected to put our best foot forward in advertising and sales promotion, and the Commission has thought that the steady use of good rich colors would be most effective.

Our advertising schedule contemplates the use of black and white newspaper space for a large share of the fresh fruit advertising and of colored magazine ads for a large portion of the advertising for canned and concentrated products. This seems to be a substantially logical division. The distribution of our fresh fruit has certain geographical and seasonal limitations so that its sale can best be promoted thru the liberal use of

black and white advertising in the daily newspapers. Such a program has the further advantage that it may be readily contracted or expanded as circumstances may change the amount of fruit moving into fresh fruit consumption and the areas into which it is to move. For example, the trend of many years was reversed this past season when fresh fruit movement increased due primarily to the California and Texas freezes. Fresh fruit markets, long since conceded to California and Texas, were opened again to us, and this, particulary with grapefruit in the Texas trade territory, may very well continue for some seasons. Even if we do not permanently hold these markets, it is well worth advertising there now to increase our fresh fruit distribution in these particular areas.

In the merchandising of our canned and concentrated products we have quite a different situation. Here we have 12 months' distribution in 48 states. In each of the geographical areas our distribution is almost directly in proportion to the wealth and population of that area. The growth of the concentrating field, of course, warrants the expenditure of constantly increased sums in the advertising of that particular product. In the season of 1947-48, the first in which there was commercial production of frozen concentrated juice, about 2 million boxes of oranges were used. During this past season the utilization had increased to nearly 10 million boxes, and may possibly increase next season to 20 or 25 million boxes. In addition, this coming season will probably see the first substantial use of grapefruit as frozen concentrate, since one concentrator has indicated his intention of using at least 2 million boxes of grapefruit, and others likewise expect to make commercial packs.

In making the primary allocation of advertising funds, a substantial reserve has been retained in order that special campaigns may be developed as the season may justify as it progresses. It must always be remembered that we are dealing with a semi-perishable crop, the condition of which may change radically on short notice due to natural conditions, and that any advertising campaign must be left flexible enough to be adjusted to such changing conditions.

In handling transportation problems, the Commission uses the facilities of the Growers and Shippers League of Florida in fresh fruit and of the Florida Canners Association in processed products. During the past year the railroads, because of repeated rate increases, have substantially priced themselves out of the market. Despite an increase in fresh fruit shipments of approximately 7 million boxes, there has been no increase in rail movement. The railroads have become sufficiently alarmed at this trend to have initiated certain discussions for reduction of rail rates on citrus fruit. The Illinois Central Railroad has gone so far as to take independent action and has published reduced rates, which, in the case of fruit moving to Chicago under refrigeration, runs as high as 30 cents a box. Other reductions have not yet been finally effected but unquestionably there will be some relief for the entire industry in rail rates for the coming season.

The Commission has maintained for years a research department under the direction of Dr. L. G. MacDowell. The outstanding accomplishment of this research division has been the development of frozen concentrate, the basic patent of which was obtained as a public service patent by Dr. MacDowell and other members of the Commission staff and then assigned to the United States Department of Agriculture. The successful accomplishment of this one venture is more than enough to justify all of the expenditures for research made during the history of the Commission. Work is now going on on a number of projects, many of which may soon show concrete results, including by-products, medical and nutritional, decay, disposition of citrus wastes, throurea toxicity, the beverage field, the feeding value of citrus molasses and the virtually untouched field of consumer acceptance.

The general authority of the Commission includes regulations for the government of the citrus industry not inconsistent with State or Federal law. One of its most important duties during recent months has been to promulgate rules and regulations pursuant to the Florida Citrus Code of 1949. This Code, as you know, made basic changes in our citrus laws, including principally the establishment of higher maturity standards for fresh fruit, authorizing the establishment of grades for canned and concentrated citrus products and the placing of the canners and concentrators under the regulatory authority of the Commission. While the statute sets forth the general rules for the government of the industry, the regulations as issued by the Commission must fit these rules to the day by day operation of packing houses and canning plants. The members of the Commission spent many weary days and nights in an effort to write an adequate set of regulations which would be workable, practical and reasonable and within the spirit, intent and purposes of the 1949 Citrus Code.

There was ample precedent to guide us in regulations regarding fresh fruit houses as fresh fruit has been under the regulatory authority of the Citrus Commission since 1935. The main task was to review the existing regulations in the light of the increased maturity standards of the new Code, and of any other conditions which may have changed. Particular attention was given to regulations regarding coloring room practices. While the only major change now written into the regulations is the reduction of the maximum temperature from 90 degrees to 85 degrees, the members of the Commission are definitely of the opinion that a great deal more can and should be done in regulating coloring rooms. For there can be little doubt that much of the early season consumer dissatisfaction with Florida fruit, which the new Code is designed to correct, has been caused by excessive decay, much of which may in turn be traced to improper coloring room practices. The Commission has adequate authority to impose any reasonable coloring room regulations. It may, under the law, prescribe the size and character of the rooms, the amount of circulation, the maximum temperatures and the maximum time. It is our intention during the coming season to make a thorough study of the problem, including the type of coloring rooms now in use, and to make specific recommendations to individual packing houses for their improvement. It is possible that by another season the Commission will feel justified in strengthening its regulations to the extent that packing houses not providing proper coloring rooms or not operating them adequately may be denied the privilege of using them. But, first of all, we believe that the education of the industry is an essential, and this we will attempt to do throughout the coming season, making specific

(Continued on page 11)

Physical and Chemical Characteristics Of Floridian Coldpressed Oil Of Orange---1947-48 Season

J. W. Kesterson[1] and O. R. McDuff[2]

Presented before the Florida State Horticultural Society in West Palm Beach, Florida, October 28, 1948.

A one year survey of the commercial production of essential oils in Florida was completed in June 1948, at which time the citrus processing industries were approaching the end of another season. Methods of commercial production, that were used throughout the state during the 1947-48 season, were studied, and the physical and chemical properties of many samples of orange oil were determined. The principal purpose of this investigation was to determine by what means essential oils of very high quality could be produced. Through the use of the data obtained, it is hoped that the citrus industry in Florida will be able to produce citrus oils which will consistently meet the specifications of the United States Pharmacopoeia (4) and also other high quality requirements of the essential oil consumers throughout the country. The production of oils of highest quality and uniformity should result in a larger consumer market.

Another purpose of this study was to determine the relationship between the physical and chemical characteristics of oil of orange and such factors as methods of extraction and methods of processing.

It is realized that the results herein presented are based on the commercial production of essential oils for only one season. However, representatives of the citrus industry have cooperated readily and have shown keen interest in this work. Therefore, some of the results of this investigation are presented at the present time, since it is believed that they will be of immediate help to those manufacturers who are now producing essential oils in Florida. A similar survey will be continued for one or two additional seasons, and other factors affecting quality will be investigated.

[1] Associate Chemist, Citrus Experiment Station, Lake Alfred, Florida.

[2] Research Fellow, Florida Citrus Commission, Citrus Experiment Station, Lake Alfred, Florida.

METHODS OF COMMERCIAL MANUFACTURE

Citrus peel oils are expressed by four different types of equipment; namely, (1) Pipkin Roll, (2) Screw Press, (3) Fraser Brace Extractor, and (4) Pipkin Juice Extractor. The general processing procedure, which is used after the extraction of the oil from the peel, is very similar in most of the commercial plants. All of the above methods of extraction give an emulsion of oil and water. The oil is separated centrifugally from the aqueous phase by passing the emulsion through a sludger (8,000 - 10,000 r.p.m.) and then through a polisher (16,000 - 18,000 r.p.m.). Following separation, the oil is stored for approximately one week at 32° - 40°F. and during this wintering treatment undesirable waxy materials separate from the oil and are allowed to settle. The clear oil is decanted into stainless steel storage tanks or tin-dipped containers, which are then maintained at a storage temperature of about 40°F. Air is usually excluded from the containers in order to prevent deterioration, and the exclusion of air is usually accomplished either by filling the container full of oil or by displacement of the air with carbon dioxide.

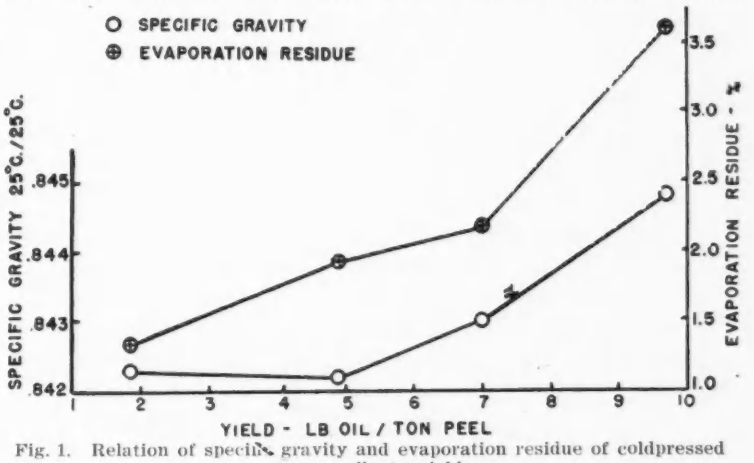


Fig. 1. Relation of specific gravity and evaporation residue of coldpressed orange oils to yield

EXPERIMENTAL PROCEDURE

Survey of Commercial Plants

Information pertaining to the various processes used in Florida for the manufacture of expressed citrus peel oils was secured through the helpful cooperation of commercial processors. In order to secure the data used in computing yield values, the authors visited plants employing the various methods of oil extraction. Rate of flow measurements were made on each unit process operation for each individual process. Data were taken covering periods of operation of 4 to 24 hours duration.

Collection of Samples

Twenty-five samples of coldpressed oil of orange were secured from four plants, each one of which was using a different method for the extraction of the oil from the peel. These samples were taken once a month from lots of oil ranging from 500 to 11,000 pounds which represented the production for approximately one week.

Methods of Analyses

The physical properties of the original oils and the 10 percent distillates were determined by the Official and Tentative Methods of

Analysis of the Association of Official Agricultural Chemists (1). The specific gravity was determined at $\frac{25°C.}{25°C.}$ and the optical rotation at 25°C. as recommended by the United States Pharmacopoeia (4).

The aldehyde content of the oils was determined by the hydroxylamine method, a standard procedure for which is given by Guenther (2). The final end point for the reaction was obtained by using a titrimeter rather than the bromphenol blue indicator. All of the aldehyde values were calculated as decyl aldehyde.

The method of Seeker and Kirby as reported by Poore (3) was used for the determination of esters. In this method the aldehydes present are removed with hydroxylamine hydrochloride prior to the saponification of the esters.

The evaporation residue was determined by a method very similar to that given by Guenther (2). A glass (100 mm. in diameter) was used in place of an evaporating dish, and after having been heated on the steam bath for the prescribed length of time the watch glass was transferred to an oven at 100°C. and dried for one hour.

EXPERIMENTAL RESULTS

Data secured at the various processing plants pertaining to the yields of oil obtained by the different methods of extraction are presented in Table 1. Table 1 also shows the relationship between the yields of coldpressed orange oils, which were obtained by the four methods of extraction, and all of the physical and chemical properties of the oils, except the aldehyde content. Data for all four of the different methods of extraction are not available for the months prior to February; therefore, they could not be used to secure average values for comparison purposes. The data presented are average values for the three months, March, April, and May, and also were secured during those months when only one variety, Valencia, of oranges was being processed. Figs. 1, 2 and 3 present these results in graphic form.

The relationship between the aldehyde content of expressed oil of orange and the quantity of aqueous phase, which comes in contact with the oil during processing, can be seen from Table 2 and Fig. 4. Here, also, the average values for the aldehyde content of samples of oil secured during March, April and May are used. The results secured for oils which were extracted during January and February by the Fraser Brace Extractor were not included in these average values because a basic change was made in this processing method after these samples of oil had been obtained. Extremely large quantities of water were being used with this extractor during January and February. In March the amount of water used was reduced to give 100 gallons of an aqueous phase per gallon of oil produced and the oil extracted in that month contained 52 percent more aldehydes than the February sample.

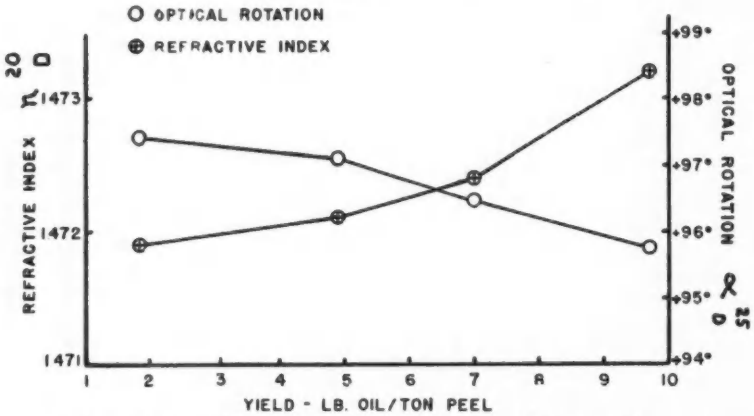


Fig. 2 Relation of refractive index and optical rotation of coldpressed orange oils to yield

DISCUSSION OF RESULTS

Relation of Yield to Properties and U. S. P. Specifications

The factor which was found to influence the physical and chemical properties of coldpressed oil of orange to the greatest extent was the yield of oil secured from the peel as shown in Table 1 and Figs. 1 and 2, as the yield increased the values for the values for the specific gravity, evaporation residue, and refractive index also increased, but the values for the optical rotation decreased. Thus the percentage of the total amount of oil in the peel that is extracted determines the characteristics of the oil and, therefore, its final quality. As the yield of oil is increased, more high-boiling, high-molecular weight constituents are evidently extracted, and the presence of a greater percentage of these compounds in the oil causes a reduction in the percentage of d-limonene, resulting in lower optical rotation values, since d-limonene is the most optically active component in the oil.

Analyses of expressed oils of orange secured during the 1947-48

Table 1. Relation of Yield to the Characteristics of Floridian Oil of Orange

Yield lb. Oil/Ton Peel	Specific Gravity 25°C./25°C.	Evaporation Residue %	Optical Rotation α_D^{25}	Refractive Index n_D^{20}	Ester Content %	Method of Extraction
9.70	.8443	3.60	+95.66	1.4732	0.94	Fraser Brace Extractor
7.00	.8439	2.18	+96.49	1.4724	0.51	Pipkin Juice Extractor
4.90	.8422	1.92	+97.11	1.4721	0.51	Screw Press
1.85	.8423	1.32	+97.41	1.4719	0.53	Pipkin Roll

Table 2. Effect of Quantity of Aqueous Phase on the Aldehyde Content of Floridian Oil of Orange.

Aqueous Phase Gal./Gal. Oil	Aldehyde Content %	Method of Extraction
12.5	1.93	Pipkin Juice Extractor
21.5	1.91	Pipkin Roll
100.0	1.58	Fraser Brace Extractor
190.0	1.47	Screw Press

season indicate that the oil produced by some of the manufacturing processes at certain times during the season did not meet the U. S. P. (4) specifications, because some of the processes resulted in yields which were too low or too high. Only one method of extraction gave yields throughout the season so that the oil consistently met the requirements of the U. S. P. However, it is apparent that if oil is extracted in such a manner that the yield falls within a certain range, then it will meet U. S. P. specifications. If the yield is below the minimum of this range, then the values for specific gravity, refractive index, and evaporation residue will be below the U. S. P. requirements, and if the yield is above the maximum of this range, then the differences between the optical rotation and refractive index values of the original oil and the 10 percent distillate will not meet the U. S. P. standards. However, utilization of data obtained during this investigation will make it possible for any processor to produce an oil which will meet U. S. P. specifications, providing that he is willing to change his manufacturing procedure. He may still use availab'e equipment in such a manner that he will secure a yield of oil having these properties which are indicative of good quality. Excessively high or low yields should be decreased or increased by the mode of operation of the extraction equipment. Based upon data accumulated during the past year it is estimated that a yield of 6.5 to 8.5 pounds of oil per ton of peel from mid-season oranges or the extraction of 45 to 60 percent of the total amount of oil in the peel of any variety of fruit of good maturity will result in a cold-pressed oil of orange that will meet the specifications of the United States Pharmacopoeia (4).

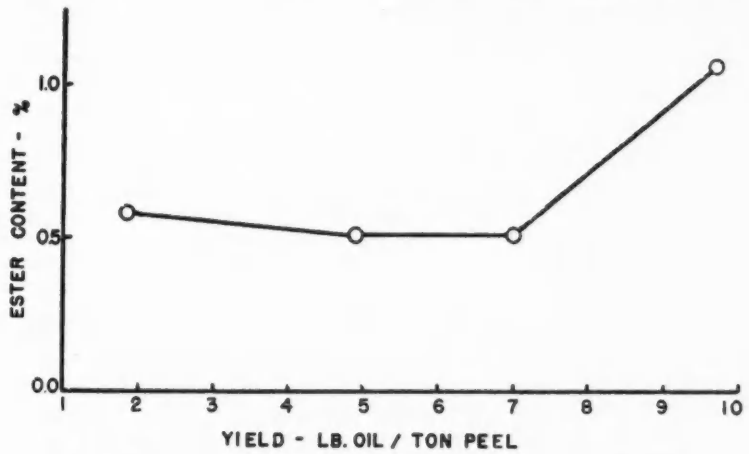


Fig. 3. Relation of ester content of coldpressed orange oils to yield

Effect of Aqueous Phase on Aldehyde Content

The flavor quality of oil of orange is dependent upon the many constituents of which it is composed. The aldehyde content of the oil, although not included in the U. S. P. specifications, is indicative of the **flavoring** qualities of the oil, and although other constituents are also very important from a flavor standpoint, aldehydes are a predominant factor in orange and other citrus oils. The data in Table 2 and Fig. 4 indicate that the aldehyde content decreases as the amount of aqueous phase, which comes in contact with the oil during processing, is increased. The average aldehyde content of the expressed oils of orange, which were secured during March, April, and May from the four plants at which material balance studies were made, varied from 1.47 to 1.93 percent. In one plant, where, at the suggestion of the authors, the water used in the process was reduced from extremely large quantities to an amount sufficient to give 100 gallons of aqueous phase per gallon of oil produced, while other variable factors were kept constant, the aldehyde content increased from 1.08 to 1.64 percent or an increase of 52 percent. Thus, it is evident that in order to produce an orange oil of high aldehyde content, the amount of aqueous phase that is allowed to come in contact with the oil during processing should be reduced to as small a quantity as is practically possible under operating conditions.

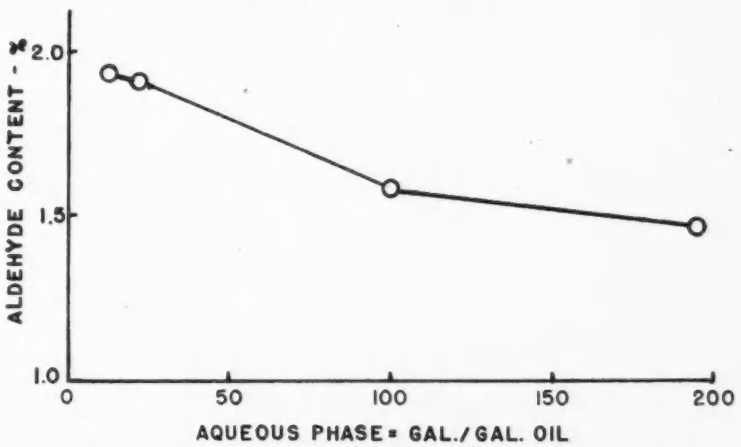


Fig. 4. Influence of the quantity of acqueous phase, which comes in contact with the oil during processing on the aldehyde content of coldpressed orange oils

SUMMARY

Commercial methods of production of oil of orange in Florida during the 1947-48 season have been studied and compared.

Quality of citrus peel oils, as indicated by their physical and chemical characteristics, is determined by the yield of oil obtained in any commercial process, regardless of the type of extraction equipment used, and also by the quantity of aqueous phase that comes in contact with the oil during processing, since the aldehyde content of the oil is largely determined by this factor.

The use of proper processing methods results in the production of essential oils in Florida which are of the highest quality and which consistently meet the specifications of the United States Pharmacopoeia. When manufactured carefully the quality of Florida oil of orange is equal or superior to essential oils from any other sources.

The Citrus Industry

with which is merged The Citrus Leaf
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Citrus Groves Hard Hit. The tropical hurricane which passed through Florida on the night of August 26 and the morning of August 27 took a heavy toll of fruit in the state's citrus groves.

Entering the state near West Palm Beach and passing north and westward, the wind played havoc with the groves in the lower Indian River section, continuing on to the Ridge sections of Highlands and Polk counties, then northward through Pasco, Lake and counties further north.

Estimates of the damage sustained vary greatly, and few citrus factors are willing to go out "on a limb" in making positive statements as to the total loss to the growers. In the lower Indian River section, one prominent grower places the injury to grapefruit at 90 percent; oranges 65 to 70 percent. Further up the coast in the Indian River area, damage to grapefruit is placed at 60 percent and oranges at 10 to 25 percent.

In the Ridge sections of Polk and Highlands counties, the estimates cover a wide range. One citrus man in whose judgment we have the utmost confidence and who in similar conditions heretofore has been noted for his accurate estimates places the loss about as follows:

Those sections of the Ridge in the direct path of the storm, Marsh seedless grapefruit 65 to 70 percent; seeded grapefruit 40 to 50 percent; early oranges 25 percent; Valencia oranges 10 to 15 percent. For the state as a whole, he places the loss between fifteen and seventeen million boxes—mostly grapefruit.

As the storm passed northward and lessened in intensity after leaving Polk county, the injury to fruit became progressively less. A well known citrus factor estimates loss in Orange county at 25 percent grapefruit, 10 percent for oranges; Lake county places its loss in grapefruit at 20 percent, oranges negligible; Pasco county reports grapefruit loss at 15 to 20 percent. Other counties further north report a much lighter loss, mostly on grapefruit.

Over on the west coast the damage was slight, Lee, Sarasota, and Manatee reporting slight loss to grapefruit and none to oranges. In Pinellas, grapefruit loss is placed at around 5 percent, with no damage to oranges.

Robert C. Evans, general manager of the Florida Citrus Commission, estimates the loss for the state at large at from 13 to 17 million boxes, with grapefruit accounting for 10 to 12 million boxes. This estimate is borne out in surveys made by other citrus factors.

Even before the storm, the grapefruit crop was much below the normal Florida production, and with Texas producing only a fraction of its normal yield due to last winter's freeze, Florida would have been called upon to supply the grapefruit demand. With this short crop still further reduced by the recent storm in Florida and with canners competing with fresh fruit shippers for the limited supply, grove owners who still have fruit on their trees should command exceptionally favorable prices for their product thus making up in a measure for the fruit destroyed by the storm.

The hurricane was not the worst Florida has ever experienced, but it was bad enough. In recent years these tropical storms have shown a tendency to sweep through the principal citrus producing regions of the state.

Mutual Names Manager. At a recent meeting of the board of directors of Florida Citrus Mutual, Alden M. Drury of Donna, Texas, was named as managing director of the super-cooperative organization. Mr. Drury comes to Florida with a background of successful service with citrus organizations in California and Texas, his latest previous connection having been with the Texsun Citrus Exchange in Texas. His salary as manager of Florida Citrus Mutual is $18,000 per year. At the same meeting the Mutual directors named Merton L. Corey as marketing counsel at a salary of $12,000. Mr. Corey, however, stated that he must take up the matter of his appointment with his associates of Carl Byoir & Associates, a public relations concern of New York, from which organization he has been on leave of absence while conducting the membership campaign of Mutual.

Nature Won't Always Help. With the high prices prevailing during the latter part of the last shipping season, and with apparently favorable outlook for continued good prices this season, some Florida growers are forgetting that nature played an important part in their long-delayed prosperity. But it won't do to depend upon nature to repeat the performance year after year. It is all right to take advantage of the breaks when they come, but we should be prepared to help ourselves when nature fails to co-operate. A short crop and lessened competition may help us this year, but we must look to the future through co-ordinated marketing control when the clouds obscure the sun.

Job For The Growers. The new citrus code may help, Florida Citrus Mutual unquestionably is destined to help, but there is one job that no one but the grower can do—and that is to produce high quality fruit. High quality fruit always has and always will command higher prices than fruit of inferior quality. Established agencies may help to keep inferior fruit from the market but their job will be much easier and of greater benefit to the growers if the growers will give them none but high quality fruit to handle.

CHAIRMAN EXPLAINS PLANS OF FLORIDA CITRUS COMMISSION

(Continued from page 6)

recommendations to individual operators as to the necessary changes.

In preparing the regulations for the canning and concentrating industry, we of course were going into a new field, as heretofore the processors have been wholly free from regulation by the State. It is unfortunate that the antagonism of some of the canners to any regulation prevented us from having the cooperation of the two canners' associations in the preparation of these rules. Obviously, an interchange of ideas would have assisted us materially in writing reasonable, practical regulations. Deprived of that assistance, the Commission has, I think, provided the canning and concentrating industry, with regulations which are reasonable and workable, and carry out the spirit, intent and purposes of the 1949 Citrus Code. If in actual operation it should prove that any of these regulations should be changed, this can of course be done on short notice.

Since the adjournment of the Legislature, the party line of the opposition to the Citrus Code has been increasingly heard. First, we had the story that oranges now bringing $7.00 and $8.00 per box could not meet the new standards. The inspection service quickly branded that statement as a fraud, but despite this certain newspaper correspondents continue to repeat it. Then, I was surprised to learn thru the press a week or so ago that canners had heretofore paid good prices for Hamlin oranges, which they would not now be allowed to use. I was not only surprised but chagrined, for somehow the canners had overlooked me in paying their high Hamlin prices. Many other statements, equally untrue, have made the rounds. But, let me remind you that the technical requirements in the Code were carefully drawn with the counsel and advice of the Citrus Inspection Bureau and the United States Department of Agriculture, and that there seems to be no logical reason to fear these requirements except on the part of those who are antagonistic to the general purpose of the Code, which is to improve the quality of Florida citrus and citrus products.

Then, we have had a rash of self-appointed constitutional lawyers who have told us how hastily and carelessly the Code was drawn. One such has described the Code as being as full of holes as a piece of Swiss cheese. All of them try to create the impression that some morning when they are not particularly busy they will take off an hour and have the Code set aside. I claim no particular insight into what the courts, which may ultimately pass upon this law, may do, but I do wish to assure you that the Code was carefully drawn by competent legal craftsmen and was examined before it was taken to

(Continued on page 18)

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Experiments On Control of Citrus Red Scale...

HERBERT SPENCER AND MAX E. OSBURN

U. S Dept. of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine(1), Ft. Pierce—At Meeting Florida Horticultural Society

The citrus red mite has become more troublesome in orange and grapefruit groves in the last decade. Some citrus growers in the Southeastern States know this pest as the red spider or purple mite.

The mite, strictly speaking, is not an insect, but is more like a miniature spider. Full-grown individuals are just large enough to be seen without a magnifying lens. They are dark purplish-red and have four pairs of honey-yellow legs. The citrus red mite is found most frequently on the upper surfaces of the leaves, but it also wanders about on the fruits, lower leaf surfaces, and twigs. The eggs are deep red and spherical in shape. They may be found with the aid of a lens on the upper surface of the leaf, in the angles formed by midrib and leaf veins, or sometimes scattered about on upper or lower leaf surfaces or on the fruit skins, usually in small depressions. The eggs hatch into larval mites, which are similar to the adults except that they have only three pairs of legs.

Two other kinds of mites do damage to citrus trees in the Southeast. The citrus rust mite is much smaller than the citrus red mite, wedge-shaped rather than roundish, and lemon yellow in color. It causes russeting of the fruit. The six-spotted mite is shaped like the citrus red mite, is greenish-yellow in color with six dark spots on the back, and is found in groups under webbing in depressions on the lower leaf surfaces. Its feeding causes the leaves to buckle, and large yellow spots appear, particularly on grapefruit leaves.

The damage resulting from a heavy infestation of citrus red mites may be considerable. Adults and young mites insert their tiny mouth parts into the leaves and fruit skins and suck out food. The tissues surrounding each feeding puncture bleach out, losing their normal green color. As many as 1,700 feeding punctures have been counted on a square inch on the upper surface of an orange leaf. Such leaves become ashy gray, and heavily infested trees can be picked out at a considerable distance by this loss of normal color. Partial defoliation may occur, the vigor of the tree may be impaired, and the infestation may contribute to the dropping of small, newly set fruits in the early summer. Infestations may subside rapidly without insecticide treatment, but usually not before some damage has been done.

Some of the circumstances re-

TABLE 1
Control of Citrus Red Mite with Dinitro and Oil Sprays
(Applications on January 21 and 24, 1944.)

Treatment (Quantities per 100 gallons)	Numbers per 200 Leaves			
	1 Week After Treatment		5 Weeks After Treatment	
	Mites	Eggs	Mites	Eggs
Dinitro-o-cresol—(40%) ¾ lb.	32	868	395	1,585
Dinitro-o-cresol (40%) ¾ lb. plus wettable sulfur 10 lb.	7	645	43	233
Dinitro-o-cyclohexylphenol (40%) ¾ lb.	0	967	7	88
Dinitro-o-cyclohexylphenol (40%) ¾ lb. plus wettable sulfur 10 lb.	0	867	3	104
Emulsive oil ¾ gal.	0	988	3	90
No spray	118	892	180	1,308

1 John A. Fluno, Minter DuPree, and Nathan Stahler assisted in these experiments.

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sponsible for the heavier citrus red mite infestations in recent years are known. In 1937 a severe infestation in grapefruit trees in central Florida followed applications of 6-6-100 bordeaux spray, and adjacent unsprayed trees had almost no infestation. More recently severe infestations have followed the use of nutritional sprays containing hydrated lime and zinc sulfate, or copper sulfate, or manganese sulfate, or combinations of these materials. In 1940-41 Holloway, Henderson, and McBurnie (1) demonstrated that citrus red mite infestations increased following the use of a spray containing zinc sulfate, copper sulfate, and hydrated lime, and also one containing zinc sulfate plus soda ash. Without doubt, much of the present difficulty with red mites is due to the more widespread use of copper fungicides and nutritional sprays.

The experiments on insecticidal control of citrus red mite to be discussed below have been in progress for more than 10 years. The results of this work have not been reported previously, but they have been made available to the citrus growers promptly in the cooperative spray and dust programs published annually by the Florida Citrus Commission.

TABLE 2
Control of Citrus Red Mite with DDT and Emulsive Oil, Alone and in Combination
(Application on August 22, 1945.)

Treatment (Quantities per 100 gallons)	Number of Mites	
	Sept. 21	Oct. 18
Emuslive oil 1½ gal.	0	2
Emulsive oil 1½ gal. plus DDT (50%) 6 lb.	0	10
DDT (50%) 6 lb.	148	12
No spray	10	6

The first experiment of this series was conducted in a grove of grapefruit trees at Isleworth, near Orlando, in 1937. The trees had been sprayed with strong bordeaux mixture and wettable sulfur early in the year, and by June there were heavy infestations of scale insects and citrus red mites. On June 18, 44 trees were sprayed with lime-sulfur, 2 gallons plus wettable sulfur 10 pounds per 100 gallons. Other trees were sprayed with a commercial white-oil emulsion at a strength of 1 2/3 gallons of oil per 100 gallons. Two days before the sprays were applied 71 percent of the sample areas (each 1 sq. in.) examined on the upper and lower leaf surfaces and fruit skins were infested with the citrus red mite. One month after the spraying 84 percent of the sample areas examined on trees that had received lime-sulfur plus wettable sulfur were infested, as compared with only 13 percent on trees that had been sprayed with oil. It was thus demonstrated that lime-sulfur plus wettable sulfur was inef-

TABLE 3
Control of Citrus Red Mite with Wettable Sulfur and Added Toxicants
(Applications on June 25 and November 6, 1947.)

Treatment (Quantities per 100 gallons)	Number of Squares Infested			
	1947			1948
	Aug. 5	Sept. 4	Dec. 31	Feb. 16
bis(p-chlorophenoxy)methane (40%) 2½ lb. plus wettable sulfur 6 lb.	5	33	38	130
Parathion (15%) 6 lb. plus wettable sulfur 6 lb.	1	85	88	140
Hexaethyl tetraphosphate (50%) 1 qt. plus wettable sulfur 6 lb.	11	72	128	147
Xanthone (92%) 2 lb. plus wettable sulfur 6 lb.	3	60	104	145
Wettable sulfur 6 lb.	8	126	163	128

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fective in controlling the red mites, and that the oil-emulsion spray was quite satisfactory.

In 1944 dinitro-ortho-cyclohexylphenol and 4,6-dinitro-ortho-cresol were compared with an emulsive oil for control of citrus red mites. The dinitro compounds were in the form of wettable powders containing 40 percent of active ingredient. They were applied at a strength of three-fourths pound of wettable powder per 100 gallons, either with or without the addition of 10 pounds of wettable sulfur. The emulsive oil was applied at three-fourths gallon of oil per 100 gallons. Samples of 200 leaves showed no red mites alive one week after being treated with oil or the two dinitro-ortho-cyclohexylphenol sprays, whereas a few survived the dinitro-ortho-cresol sprays (Table I). Five weeks after the spraying many more eggs and mites were found on the trees sprayed with dinitro-ortho-cresol than on the trees sprayed with oil or dinitro-ortho-cyclohexylphenol, which were equal in effectiveness. The dinitro materials were found to be compatible with wettable sulfur.

A third experiment was started in 1945. On March 15 blocks of Valencia orange trees were sprayed with xanthone at 1 or 2 pounds per 100 gallons, or with a commercial emulsive oil at 1 gallon per 100 gallons. The xanthone was dissolved in 1 quart of kerosene in each case, and was made emulsive with 2 ounces of phathalic glyceryl alkyd resin. Two weeks later no mites could be found on 200-leaf samples from the sprayed trees, whereas on trees left unsprayed for comparison similar samples yielded 33 mites.

A fourth experiment was set up in another grove of Valencias to compare xanthone, dinitro-ortho-cyclohexylphenol, and emulsive oil for control of the citrus red mite. These trees had been sprayed uniformly on April 20, 1945, with a nutritional spray of copper and manganese sulfates plus hydrated lime and wettable sulfur. The treatments, consisting of xanthone 1 pound, dinitro-ortho-cyclohexylphenol (40-percent wettable) 5½ ounces plus wettable sulfur 2½ pounds, and emulsive oil 2 quarts per 100 gallons, were applied on June 28. Samples of 50 1-inch squares each on upper and lower leaf surfaces examined on July 6 yielded 14 mites on the xanthone-treated trees, 8 on the dinitro-treated trees, only one on the oil block, and 95 on trees left unsprayed. All three of these sprays gave satisfactory control.

Later in 1945 an experiment was made to compare a commercial emulsive oil with wettable DDT for control of red mites. The wettable DDT was a 50-per-cent material, extended with pyrophyllite, and was applied at 6 pounds per 100 gallons. The emulsive oil was used at 1½ gallons per 100 gallons of spray. DDT was also used in combination with the emulsive oil. The application date was August 22, and 1 month and 2 months later the mites on 1-square-inch samples from 200 leaves were counted for each treatment. The results are given in Table 2.

TABLE 4
Protection Against Citrus Red Mite Feeding Afforded to Leaves by Various Sprays
(Applications on February 19, 1948.)

Treatment (Quantities per 100 gallons)	Number of Feeding Punctures on May 19, 1948
bis(p-chlorophenoxy(methane (40%) 2½ lbs. plus wettable sulfur 6 lb.	11,875
Parathion (25%) 4 lb. plus wettable sulfur 6 lb.	18,864
Tetraethyl pyrophosphate (79.4%) 1 pt. plus wettable sulfur 6 lb.	52,888
Xanthone 2 lb. plus wettable sulfur 6 lb.	30,715
Wettable sulfur 6 lb.	40,997

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Marked increases in red mite infestations followed the use of the DDT spray. These increases may have been due to the heavy residues of inert pyrophyllite on the leaves, because inert residues are known to encourage red mite increases, or to other factors, such as elimination of beneficial predators. The oil spray alone gave excellent control, and the control was not improved when DDT was combined with the oil.

On July 7, 1945, in a preliminary test of a new material, 1 pound of 10-percent hydroxymethylflavan was dusted on a single orange tree. On August 6, 79 mites were found on 30 1-square-inch samples. In this test the flavan showed no promise for control.

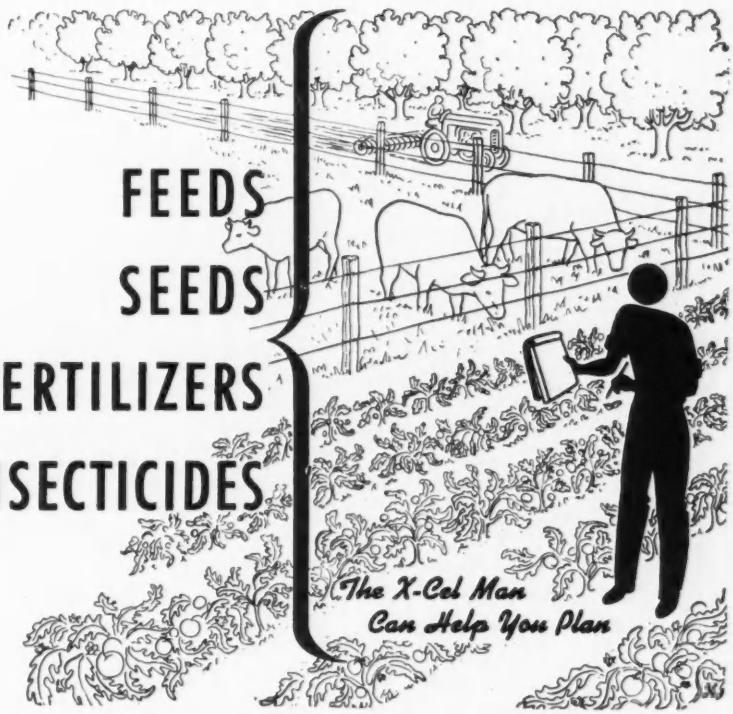
A spray of 15 pounds of wettable sulfur plus 1 pound of dinitro-ortho-cyclohexylphenol (40-percent wettable) per 100 gallons protected Valencia trees against infestation by citrus red mites and rust mites from December 11, 1946 to July 2, 1947.

In 1947 several insecticides were tested in combination with wettable culfur for simultaneous control of rust mites and red mites and other citrus pests. To 6 pounds of wettable sulfur 4 pounds of 30-percent hydroxymethylflavan, 1 pint of chlordane, or 1 quart of Lorol-2-thiazolinyl sulfide was added for each 100 gallons of spray. Suitable dispersants were used to mix the last two in water. The sprays were applied on June 25 and 26. The wettable sulfur plus Lorol-2-thiazonlinyl sulfide caused spray burn and severe defoliation, and by September 3 the trees sprayed with the flavan and chlordane combinations had as many red mites as those sprayed with wettable sulfur alone. These combinations were therefore abandoned as unsatisfactory.

A somewhat larger experiment was set up near Fort Pierce in 1947. On May 26 a group of 50 mature Valencia trees was treated with a nutritional spray of copper sulfate, zinc sulfate, and manganese sulfate, 3 pounds each, and hydrated lime 6 pounds, per 100 gallons of water. This spray was applied to encourage build-up of mite infestations and, secondarily, to remedy certain slight nutritional deficiencies. Later these trees were plotted off into 10 blocks of 5 trees each for comparison of four combination sprays with a standard wettable-sulfur spray. The five treatments were randomized in each block, on single-tree plots. The combination sprays consisted of wettable sulfur plus bis(parachlorophenoxy) methane, parathion, hexaethyl tetraphosphate, (10 percent tetraethyl pyrophosphate(or xanthone. The treatments were applied on June 25 and 26, and again on November 6 (Table 3.) At intervals throughout the year and until February 1948, examinations for infestations by rust mites were made, with the aid of linen-tester hand lenses just large enough to cover a 1-inch square. On each tree examinations were made of 10 leaves on the upper surface, 10 on the lower surface, and 10 fruits. Records are based on the numbers of infested squares per 300 examined for each treatment on each date. As usual the wettable sulfur held rust mite infestations to a very low level throughout the year. Six-spotted mites were absent, although adjacent untreated grapefruit trees had serious infestations. Data on control of citrus red mites are given in Table 3.

The red mite infestations re-

(Continued on page 18)



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Reports Of Our Field Men . . .

SOUTHWEST FLORIDA
Eaves Allison

The first gladioli plantings in this area went in around the first of August as another flower season gets under way. Vegetable growers have planted their seed beds and are beginning to get their first blocks of land ready for fall plantings. Another season is here, after what seems like no interval at all. Rains have continued and have been pretty heavy at times, making the month of August a wet one, and a fairly cool one as well. Citrus fruits are sizing up well and the coming crop looks to be one of real quality, and most growers are surprized to find that they have as much fruit as they find on their trees. There is much optimism prevailing about the outlook for the coming season with lots of emphasis on the growing importance of the frozen concentrate operations on the price structure. As usual, you can't sell it if you haven't got it or if it is not good enough, so keep on feeding your trees plenty of fertilizer at the right times

SOUTH POLK, HIGHLANDS & HARDEE COUNTIES
R. L. (Bob) Padgett

In spite of the long spring drought it can now safely be said that we have a fair crop of citrus fruits in this section. Since our fruit has started showing a little size most growers are finding that they have much more fruit than was at first anticipated. Cover crops were late getting started this summer and many growers were beginning to worry, but with rains becoming plentiful, our cover crops started to grow and are now in very fine shape. In fact many growers are now mowing or chopping with the expectation that another crop can be cut in at a later date. This is very important, and I do not believe that it is possible to over emphasize the importance of growing cover crops on the type of soil that we have throughout this territory. Benefits have been proven time and time again from the growth of cover and green manure crops in production of row crops and the same is true in the case of citrus production. Rust mite have been very prevalent throughout this territory and have been very difficult to control, so be smart and keep a close check on this pest.

NORTH CENTRAL FLORIDA
V. E. (Val) Bourland

We had some dry weather during the spring and early summer that made a large number of our groves look bad and some growers were predicting a small crop of fruit, but then the rains started and they have done a wonderful job for our grove properties. In fact, at the present time our groves are in excellent condition and our new fruit crop is sizing up very nicely. In spite of oil sprays that have been applied we still have some very heavy infestations of scale insects Rust mites have been plentiful and hard to control but I am glad to report that this pest has been kept very well under control. Cover crops have made a very fine growth this summer and at the present time there is a great deal of either mowing or chopping being done.

POLK COUNTY
J. M. (Jim) Sample

We have been getting ample rain during the past month to take care of existing requirements, but not in sufficient amounts to build up very much of a reserve. Many of our lakes are much lower than they nomally should be at this time and we are hoping for much more moisture before the fall season. Fruit has been sizing up well and will be of good quality. Even the late bloom appears to be in very good condition. Cover crops have made a nice growth during the summer and many growers are now cutting or mowing, with the hope that they will get a second growth. Rust mite have been very active this summer and difficult to control, but with continued effort on the part of the grower we find very little rusty fruit Scale insects have also been plentiful, and most groves have been sprayed with oil. Packing house operators are getting their equipment in shape for the coming season, but we haven't seen many buyers in the territory However it is a little early for these fellows to start operating, but growers are hopeful that they will soon show some activity at good prices.

HILLSBOROUGH & PINELLAS COUNTIES
C S. (Charlie) Little

It seems that we cannot get away from talking about scale insects in this territory but we are still having our trouble with them. Many groves are now being sprayed or already have been sprayed with oil for the second time. Rust mite are also bad and in some spots we have allowed rust mite to do a little damage to fruit. We have a fairly good crop of fruit that is sizing up nicely. There is a considerable amount of late bloom and this looks like it will develop into good quality fruit. Young trees are being cultivated and fertilized, and they have made a nice growth during the past few months. Cover crops are good and are now being chopped. Many growers in this territory have done a good job of pruning this summer. This was badly needed after the severe drought that we had during the spring and early summer There is a general feeling of optimism prevailing throughout the territory and we beleive it is justified.

WEST CENTRAL FLORIDA
E. A. (Mac) McCartney

We are getting plenty of rain in most sections of this territory but we can stand and are hoping for lots more before the summer is over. We have had an excellent flush of growth this summer and our fruit - all varieties - are sizing up in good shape. Rust mite have been bad and are continuing that way with most spray and dusting rigs going at full capacity. Cover crops have been very good and are now being chopped into the soil. The fall vegetable deal will be about as it has been for the past few years as to crops and acreage. Vegetable growers are now busy preparing their land and getting their seed beds under way. We had a succesful season last year and with dry weather all along the Atlantic Coast we understand that their crops were short with very little canning being done. Taking this into consideration, and with continued prosperity throughout the Nation it would appear that vegetable growers should have a very good fall and spring season. Citrus growers are also felling optimistic about their prospects for the fall and spring shipping season.

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"Little Known Facts About A Well Known Company"

On July 1, 1924, the Lyons Fertilizer Company was organized to serve the agricultural interests in the state of Florida. Mr. W. L. Waring, Jr., one of the principal heads of the new found company, has continued since that date in the active management and operation of this company.

Since its original incorporation the Lyons Fertilizer Company has endeavored c o n s t a n t l y to promote the development of Florida agriculture. The Lyons Fertilizer Company has conducted a great deal of individual research and expended considerable money to develop and promote better fertilizers and a better knowledge of their use for the benefit of the Florida growers.

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It is not generally known but the stock in the Lyons Fertilizer Company is 100% owned by the present employees or retired employees. This employee ownership and control works directly to the benefit of Florida agriculture for it is only through continued service and customer satisfaction that the stockholders of the organization can hope to make a profit. It is therefore up to the employees to see that their customers receive the utmost in service and desired results.

10 men in the general office and sales department have devoted a total of 140 years of service to Lyons customers. This is an average of 14 years each. From this accumulation of 140 years of service to Florida agriculture naturally will come a great deal of practical knowledge as well as scientific knowedge that can be used for the benefit of the growers of the state.

Lyons Fertilizer Company is proud of its achievements and promises its customers cooperation in the development of Florida agriculture.

Lyons Fertilizer Company

P. O. Box 310

TAMPA, FLORIDA

EXPERIMENTS ON CONTROL OF CITRUS RED SCALE

(Continued from page 15)

mained low for 2 months. On August 5 the trees sprayed with wettable sulfur had only 8 infested squares out of 300 examined, and the combination sprays were not significantly different from each other. However, the September 4 examinations revealed a sharp increase in infestation, up to 126 infested squares for wettable sulfur alone and up to 33 and 85 for the combination sprays. Wettable sulfur plus bis(para-chlorophenoxy) methane was superior to the other combinations during the summer.

In 1948 this combination-spray experiment was repeated on the same trees with only slight change. The treatments used and the results obtained are shown in Table 4. A peak of red mite infestation followed the treatments, but subsided rapidly in May. The effect of the sprays was determined by counting feeding punctures on samples one-half-inch square from 100 leaves for each treatment. The wettable sulfur plus bis (para-chlorophenoxy) methane gave the best protection against red mite injury for the three-month period. Wettable sulfur plus parathion was also very good, and wettable sulfur plus xanthone gave moderate protection. However, the addition of tetraethyl pyrophosphate to wettable sulfur increased the injury. Without doubt it killed some mites and many beneficial insects when first applied but, being soluble in water, it was washed away by rains long before the data were aken. Mites probably increased unchecked after residues were washed away, and then did their damage. Multiple applications of tetraethyl pyrophosphate might have given better control, but would have been too expensive. Single applications of bis(para-chlorophenoxy) methane and parathion in combination with sulfur gave prolonged protection.

In a second block of Valencia orange trees near Fort Pierce, it was possible to compare the control of red mites obtained with parathion emulsion and with 1-percent emulsive-oil spray. The parathion was a 20-percent emulsion concentrate. Sprayings were made on June 17 and October 21. Red mite counts were taken at intervals throughout the year. The numbers of infested squares per 300 examined are shown in Table 5.

TABLE 5
Control of Citrus Red Mite with Oil and Parathion Emulsion Sprays
(Applications on June 17 and October 21, 1948.)

Treatment (Quantities per 100 gallons)	Infested Squares			
	July 16	Aug. 20	Sept. 8	Dec. 19
Parathion emulsion (20%) 1 qt.	81	3	23	33
Emulsive oil 1 gal.	76	1	1	11
None	95	2	7	8

Red mite infestations in unsprayed trees were heavy on July 16, but on August 20 and September 8 they had subsided naturally. There was no rise in the fall or early winter. A month after the first spraying with parathion emulsion the red mites were practically as numerous on the treated trees as on the unsprayed trees. In August this infestation subsided, but built up again in September and stayed high until December 19. In the fall months the parathion emulsion seemed to cause build-up of red mites far above that on the unsprayed trees. The trees that were sprayed with oil in June and October had low levels of red mite infestation throughout the year.

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CHAIRMAN EXPLAINS PLANS OF FLORIDA CITRUS COMMISSION

(Continued from page 11)

Tallahassee by a number of highly competent lawyers, and in their unanimous opinion was constitutional. While the bill was before the Legislature, it was referred to a joint sub-committee of the House and Senate committees on citrus fruit, composed entirely of lawyers, for the purpose of making recommendations as to re-drafting, and that committee reported unanimously that the bill was properly drawn. A prominent member of the State Senate, who bears an excellent reputation as a constitutional lawyer, supported the bill and was prepared to defend its constitutionality in debate if the question was raised.

The Commission is charged with the responsibility of defending this law, and that responsibility will be carried out. Let me assure you that if the law is attacked it will be defended vigorously by competent counsel, if necessary to the courts of last resort. Not only does the Commission have ample authority to employ such attorney or attorneys as may be necessary properly to defend the law but substantial private interests within the industry are ready to contribute the services of their counsel. This law as it was passed represents the wishes, hopes and aspirations of a vast majority of the industry in Florida over a period of years, and the Commission will not allow it to go by default.

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